

Title : Experimental estimation of CLASP spatial resolution: results of the instrument's optical alignment.

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Abstract:

The Chromospheric Lyman-Alpha SpectroPolarimeter (CLASP) is a sounding-rocket experiment currently being built at the National Astronomical Observatory of Japan. This instrument aims to probe for the first time the magnetic field strength and orientation in the solar upper-chromosphere and lower-transition region. CLASP will measure the polarization of the Lyman-Alpha line (121.6nm) with an unprecedented accuracy, and derive the magnetic field information through the Hanle effect.

Although polarization accuracy and spectral resolution are crucial for the Hanle effect detection, spatial resolution is also important to get reliable context image via the slit-jaw camera. As spatial resolution is directly related with the alignment of optics, it is also a good way of ensuring the alignment of the instrument to meet the scientific requirement.

This poster will detail the experiments carried out to align CLASP's optics (telescope and spectrograph), as both part of the instrument were aligned separately.

The telescope was aligned in double-pass mode, and a laser interferometer (He-Ne) was used to measure the telescope's wavefront error (WFE). The secondary mirror tilt and position were adjusted to remove comas and defocus aberrations from the WFE. Effect of gravity on the WFE measurement was estimated and the final WFE derived in zero-g condition for CLASP telescope will be presented. In addition, an estimation of the spot shape and size derived from the final WFE will also be shown.

The spectrograph was aligned with a custom procedure: because Ly- α light is absorbed by air, the spectrograph's off-axis parabolic mirrors were aligned in Visible Light (VL) using a custom-made VL grating instead of the flight Ly- α grating. Results of the alignment in Visible Light will be shown and the spot shape recorded with CCDs at various position along the slit will be displayed.

Results from both alignment experiment will be compared to the design requirement, and will be combined in order to estimate CLASP spatial resolution after its alignment in visible light.